Dual N-Channel Enhancement Mode Power MOSFET

MTB60A06DH8

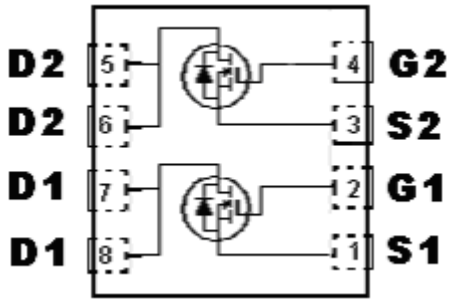
BV_{DSS}	60V
I_D@V_{GS}=10V, T_C=25°C	15A
I_D@V_{GS}=10V, T_C=100°C	9.5A
I_D@V_{GS}=10V, T_A=25°C	4.5A
I_D@V_{GS}=10V, T_A=70°C	3.6A
$R_{DS(ON)}$@V_{GS}=10V, I_D=5A	34mΩ(typ)
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=5A	38mΩ(typ)

Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and Halogen-free package

Equivalent Circuit

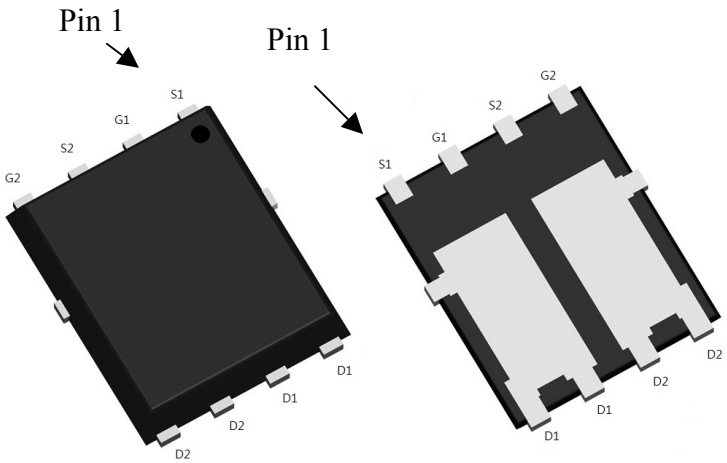
MTB60A06DH8



G：Gate D：Drain S：Source

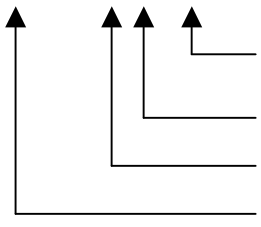
Outline

DFN5x6



Ordering Information

Device	Package	Shipping
MTB60A06DH8-0-T6-G	DFN 5 x6 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T6 : 3000 pcs / tape & reel,13” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter			Symbol	Limits	Unit
Drain-Source Voltage			V_{DS}	60	V
Gate-Source Voltage			V_{GS}	±20	
Continuous Drain Current @T_C=25°C, V_{GS}=10V		(Note 1)	I_D	15	A
Continuous Drain Current @T_C=100°C, V_{GS}=10V		(Note 1)		9.5	
Continuous Drain Current @T_A=25°C, V_{GS}=10V		(Note 2)	I_{DSM}	4.5	
Continuous Drain Current @T_A=70°C, V_{GS}=10V		(Note 2)		3.6	
Pulsed Drain Current @ V_{GS}=10V		(Note 3)	I_{DM}	60	
Avalanche Current		(Note 3)	I_{AS}	15	
Single Pulse Avalanche Energy @ L=1mH, I_D=10Amps, V_{DD}=50V		(Note 5)	E_{AS}	50	mJ
Repetitive Avalanche Energy		(Note 3)	E_{AR}	2.1	
Power Dissipation	T_C=25°C	(Note 1)	P_D	21	W
	T_C=100°C	(Note 1)		8.4	
	T_A=25°C	(Note 2)	P_{DSM}	1.8	
	T_A=70°C	(Note 2)		1.2	
Operating Junction and Storage Temperature			Tj, Tstg	-55~+150	°C

*Drain current limited by maximum junction temperature

Thermal Data

Parameter		Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max		$R_{\theta JC}$	6	°C/W
Thermal Resistance, Junction-to-ambient, max	(Note 4)	$R_{\theta JA}$	70	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in²FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

3. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

4. When mounted on1 in² copper pad of FR-4 board ; 125°C/W when mounted on minimum copper pad.

5. 100% tested by conditions of L=0.1mH, I_{AS}=10A, V_{GS}=10V, V_{DD}=25V.

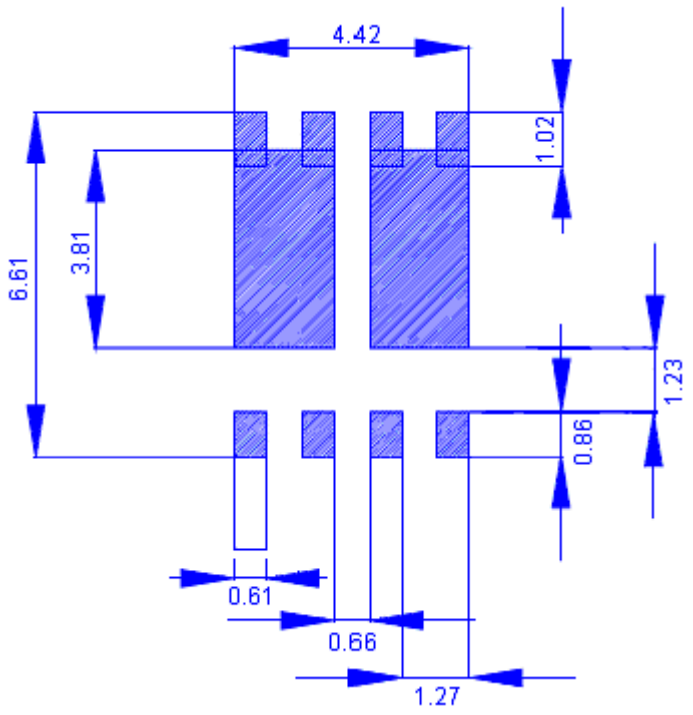
Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.06	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	7	-	S	V_{DS} =10V, I_D=5A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V

I_{DSS}	-	-	1	μA	V_{DS} =48V, V_{GS} =0V
	-	-	25		V_{DS} =48V, V_{GS} =0V, Tj=85°C
*$R_{DS(ON)}$	-	34	43	mΩ	V_{GS} =10V, I_D=5A
	-	38	50		V_{GS} =4.5V, I_D=5A
Dynamic					
*Qg	-	17.4	26.1	nC	V_{DS}=30V, I_D=5A, V_{GS}=10V
*Qgs	-	3.1	-		
*Qgd	-	2.9	-		
*$t_{d(ON)}$	-	9	13.5	ns	V_{DS}=30V, I_D=1A, V_{GS}=10V, R_G=6Ω
*tr	-	17	25.5		
*$t_{d(OFF)}$	-	34.8	52.2		
*t_f	-	7	10.5		
Ciss	-	882	1323	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	43	65		
Crss	-	37	56		
Rg	-	2.3	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	15	A	
*I_{SM}	-	-	60		
*V_{SD}	-	0.81	1.2	V	I_S=5A, V_{GS}=0V
*trr	-	11.4	-	ns	V_{GS}=0V, I_F=5A, dI_F/dt=100A/μs
*Qrr	-	7	-	nC	

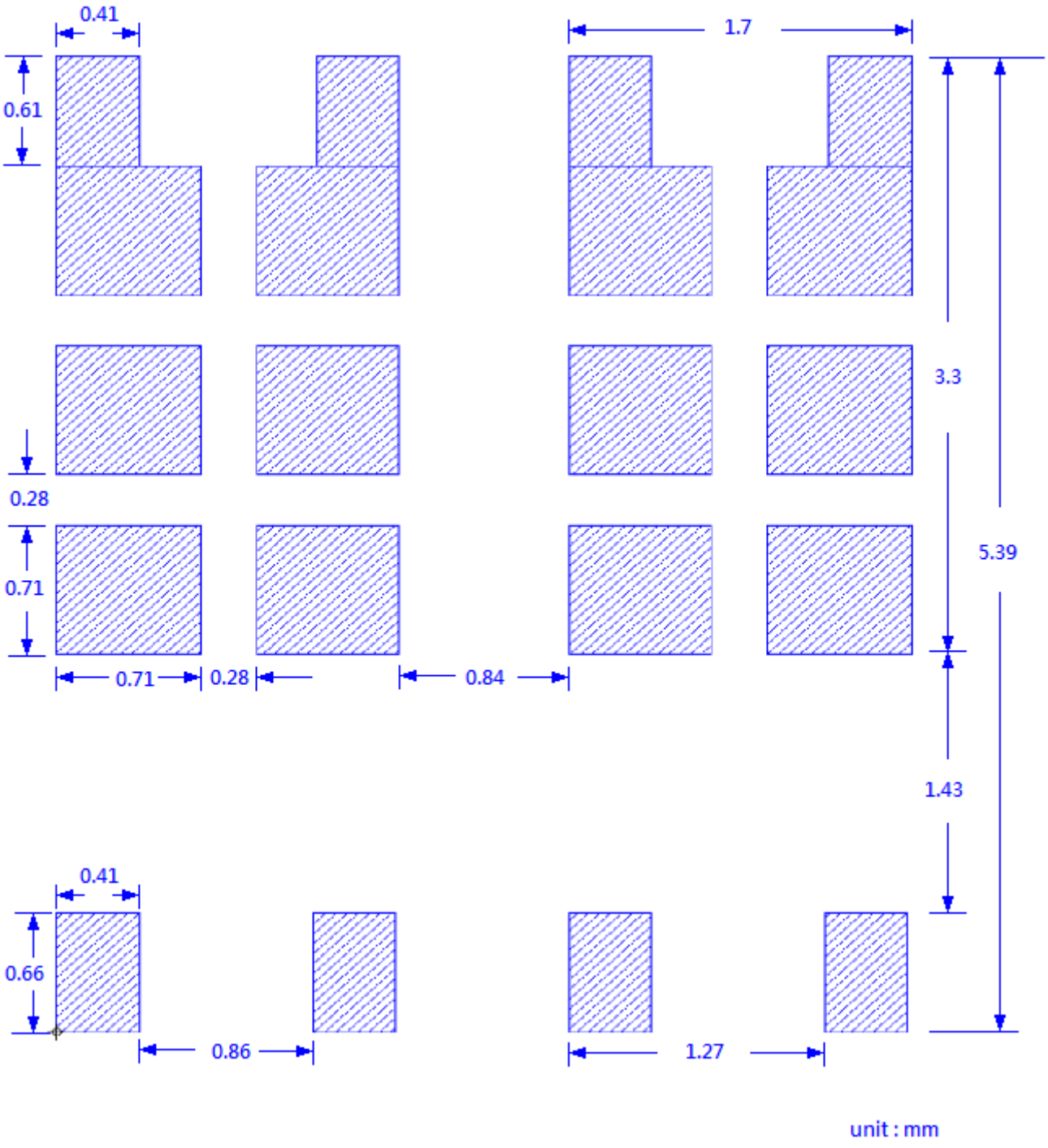
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint



unit : mm

Recommended Stencil Design

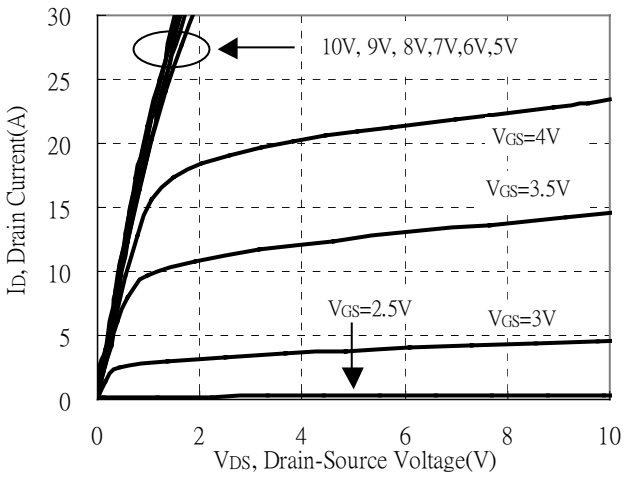


Note : 1. Stencil thickness 5 mil (0.127mm)

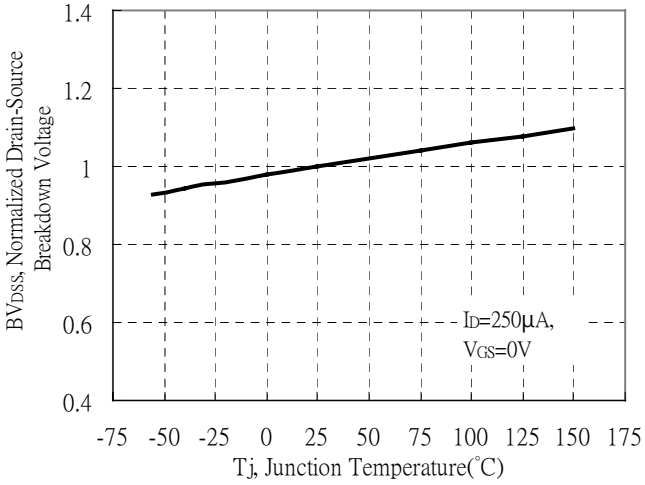
2. May need to be adjusted to specific requirements.

Typical Characteristics

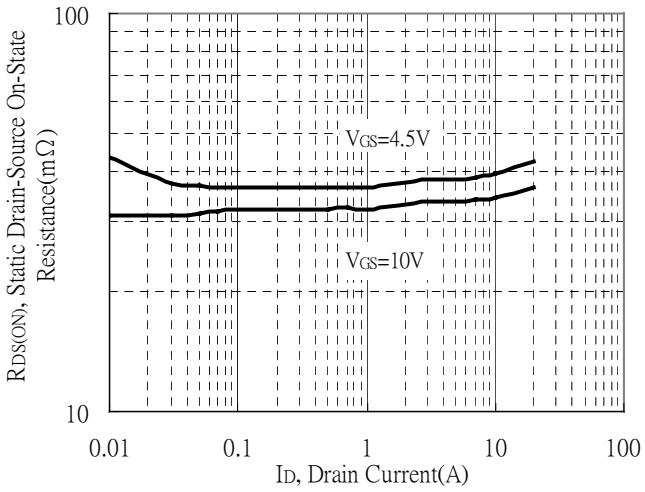
Typical Output Characteristics



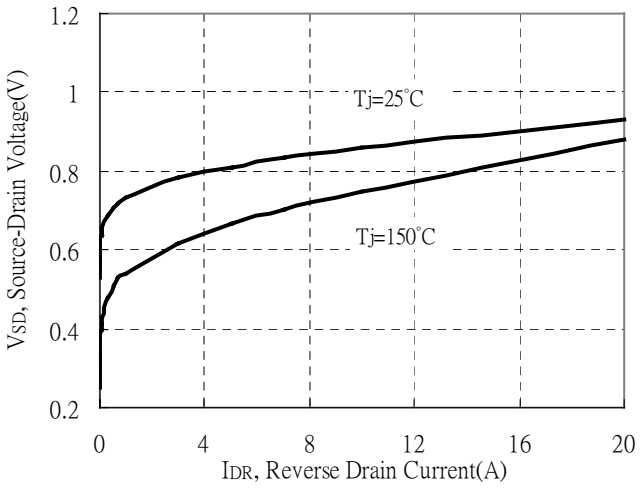
Brekdown Voltage vs Ambient Temperature



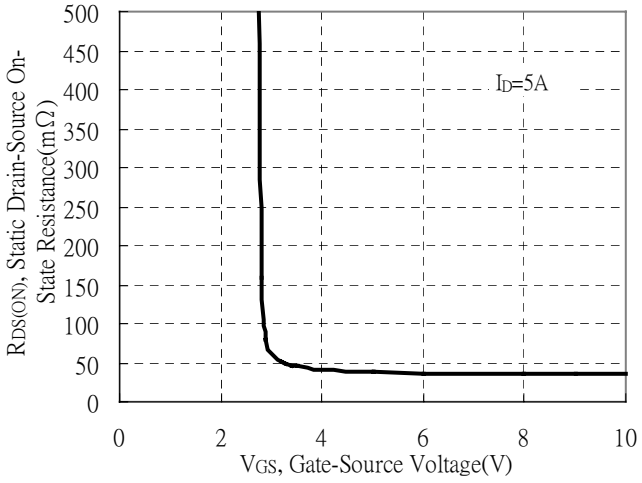
Static Drain-Source On-State resistance vs Drain Current



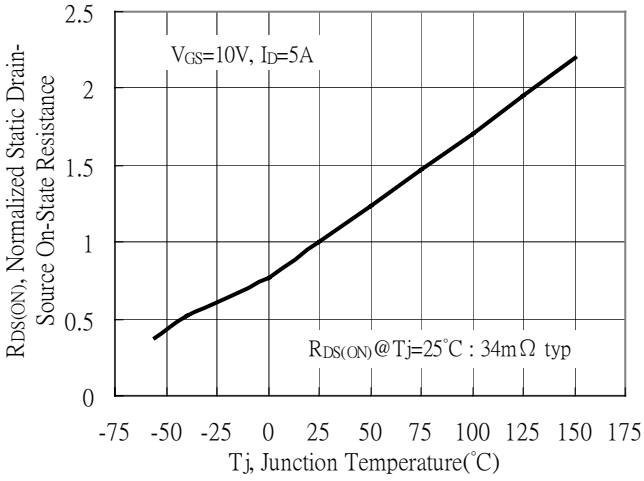
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

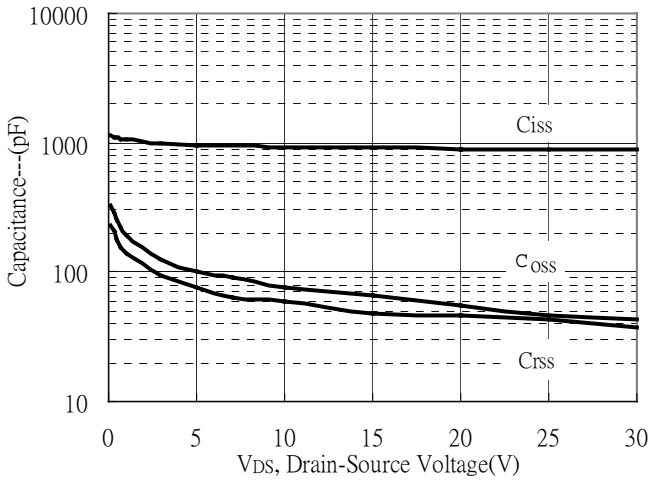


Drain-Source On-State Resistance vs Junction Tempearture

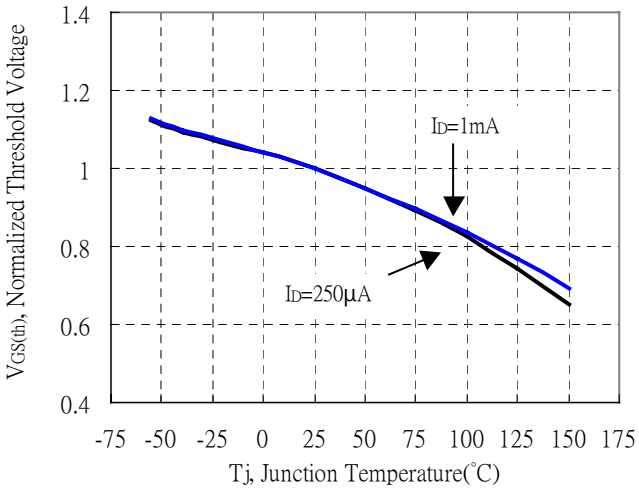


Typical Characteristics(Cont.)

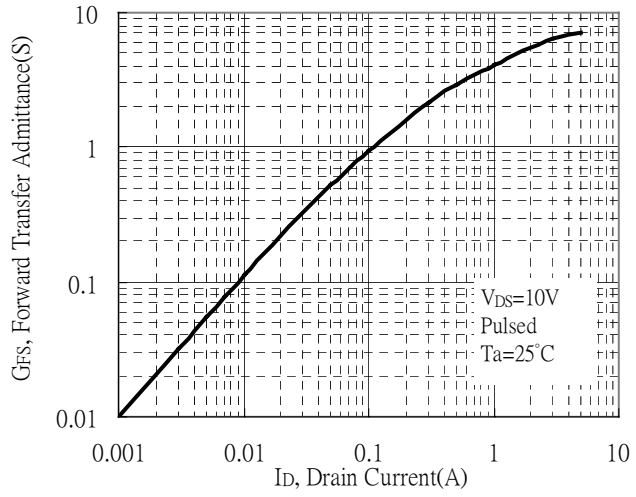
Capacitance vs Drain-to-Source Voltage



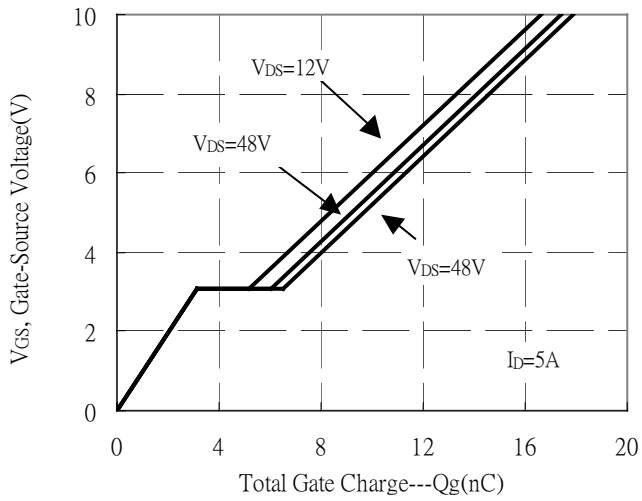
NormalizedThreshold Voltage vs Junction Tempearture



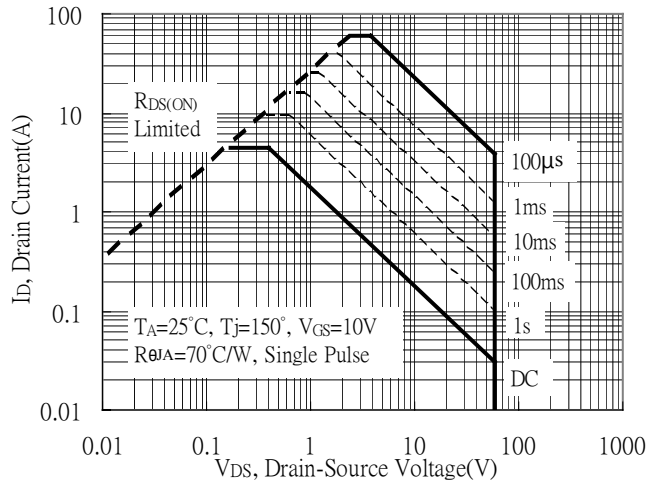
Forward Transfer Admittance vs Drain Current



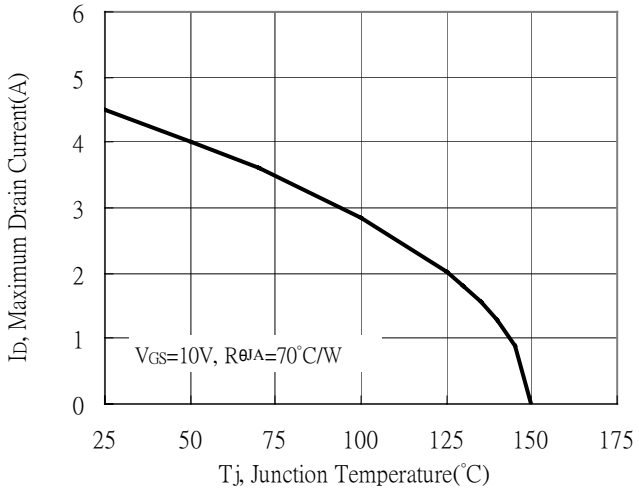
Gate Charge Characteristics



Maximum Safe Operating Area

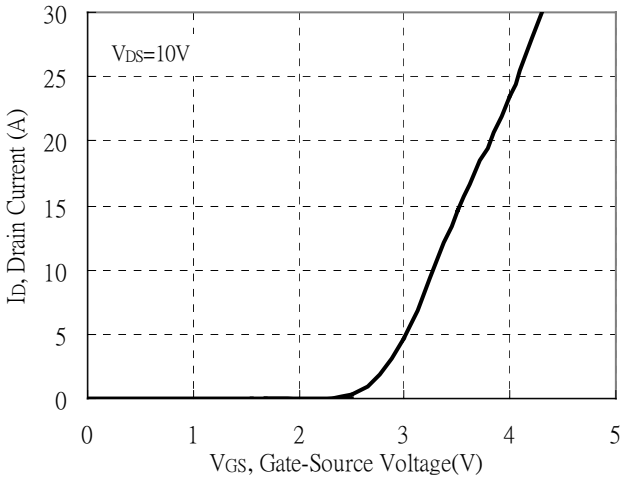


Maximum Drain Current vs Junction Temperature

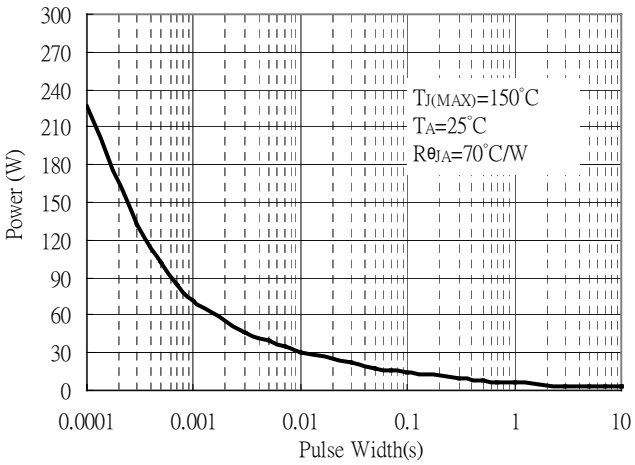


Typical Characteristics(Cont.)

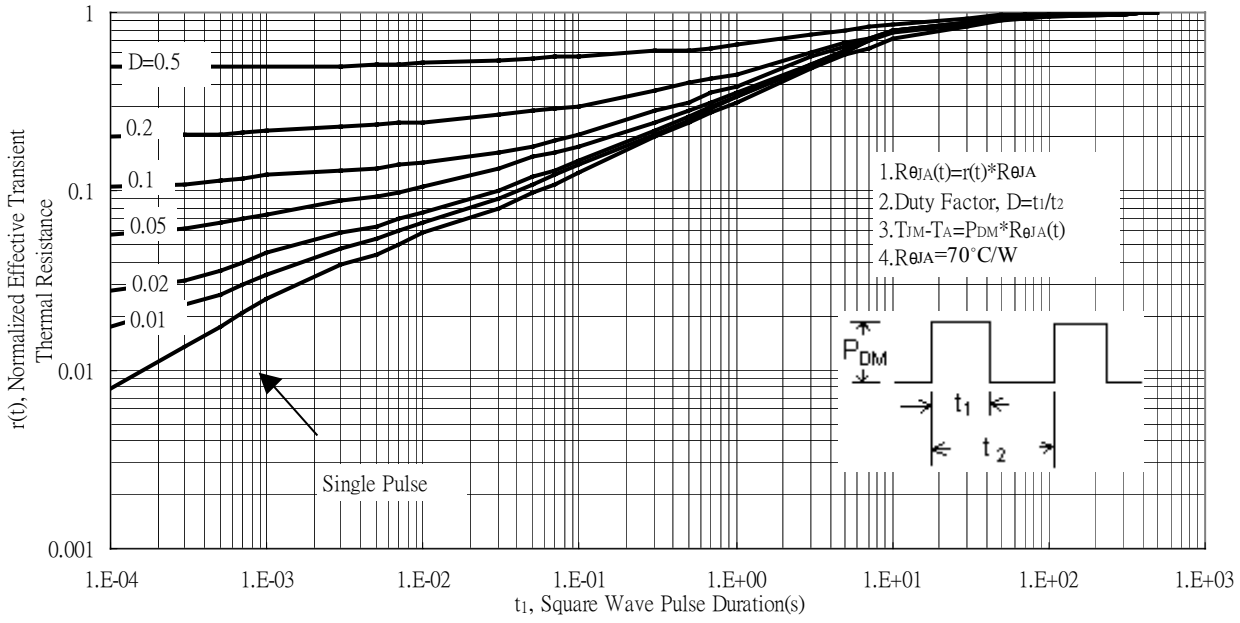
Typical Transfer Characteristics



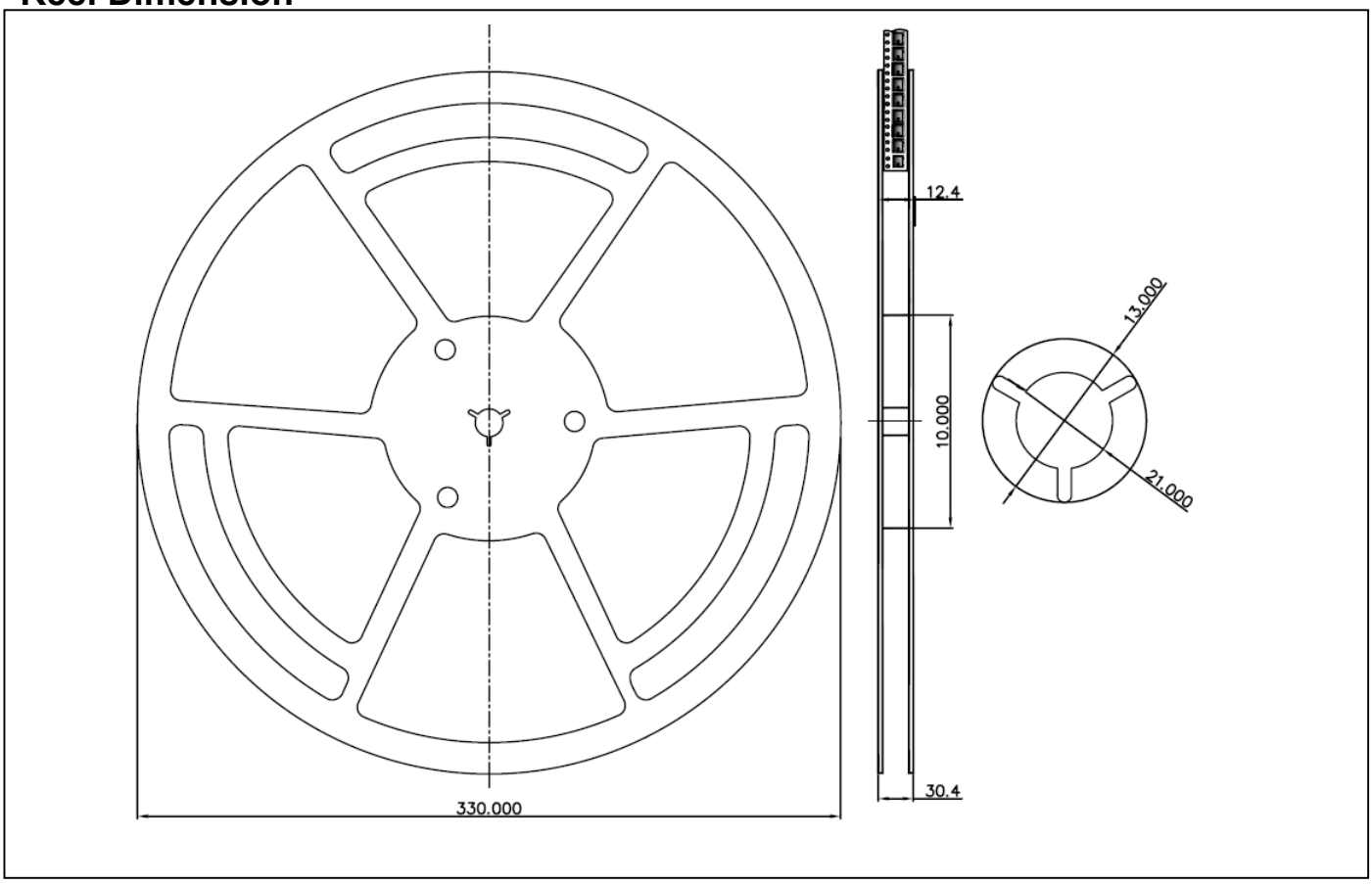
Single Pulse Maximum Power Dissipation
(Please see Note on page 2)



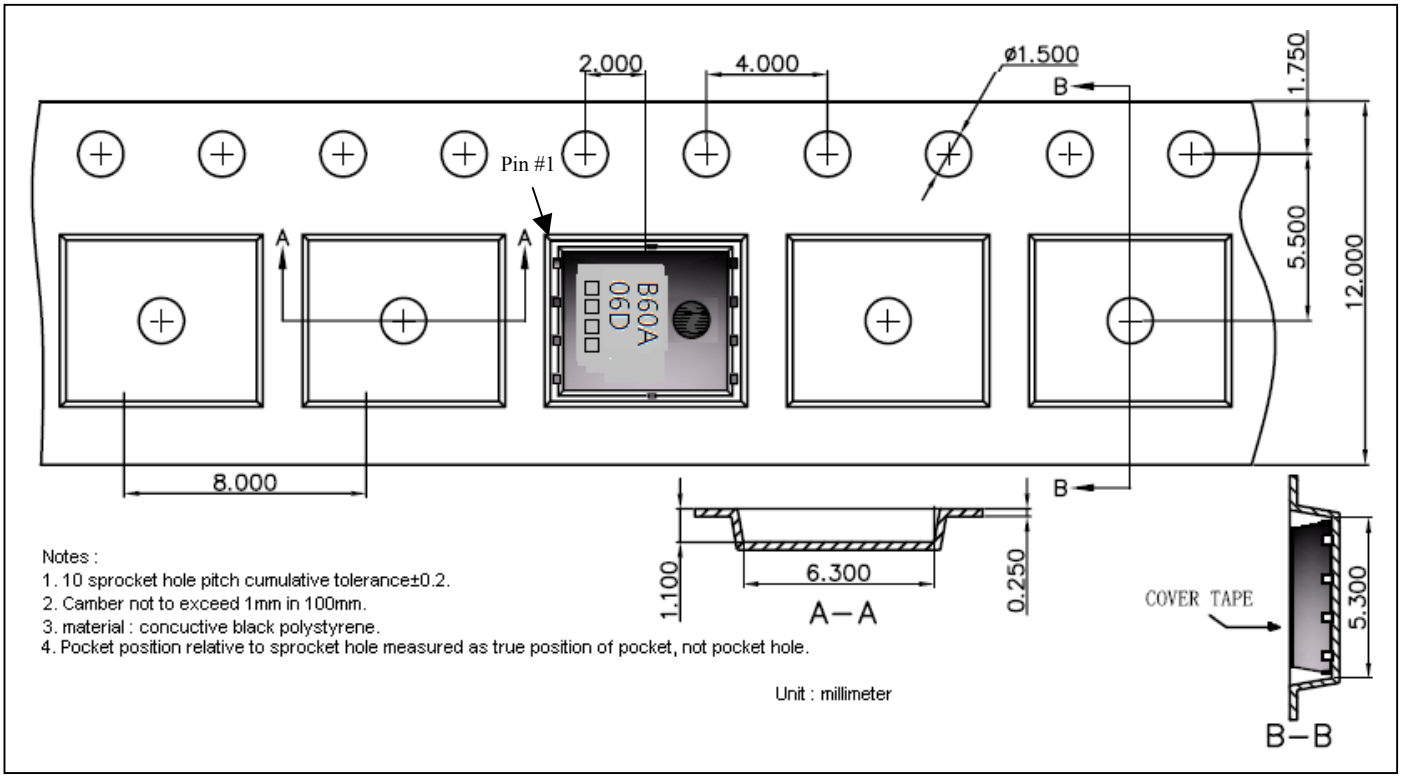
Transient Thermal Response Curves



Reel Dimension



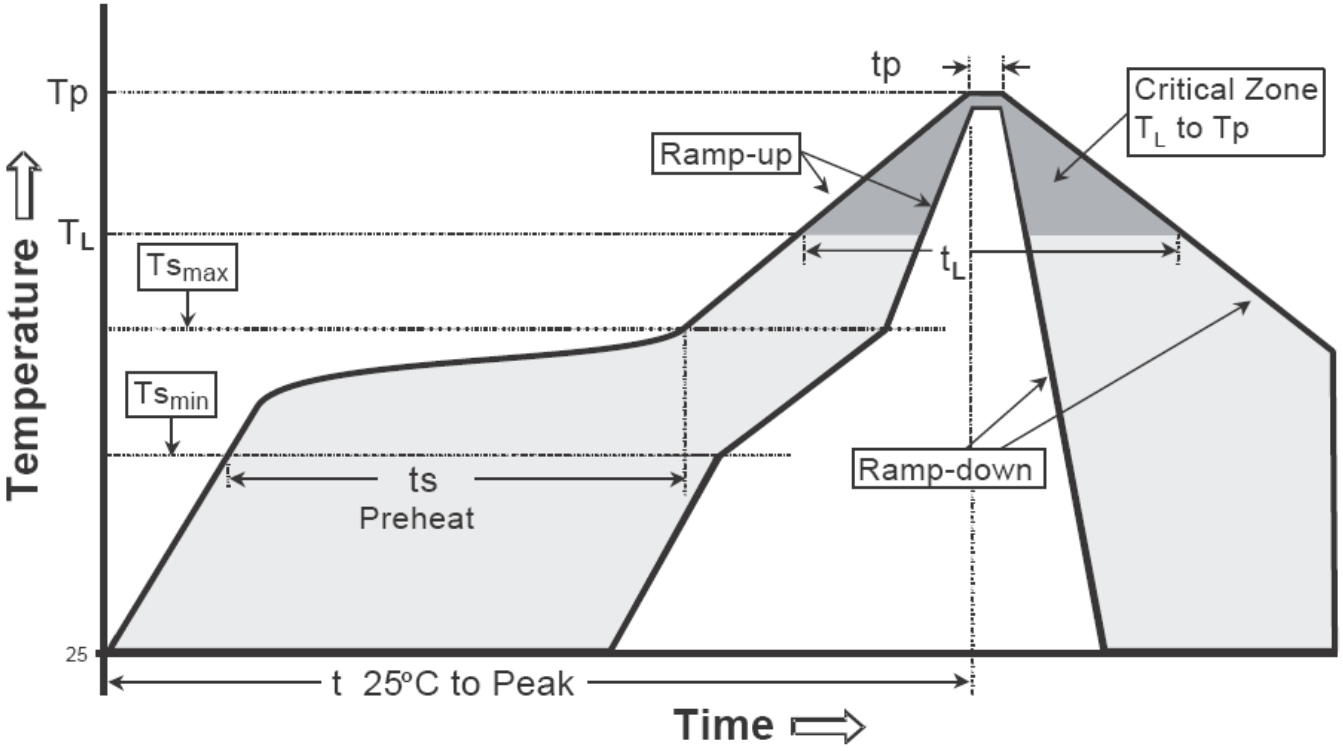
Carrier Tape Dimension



Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

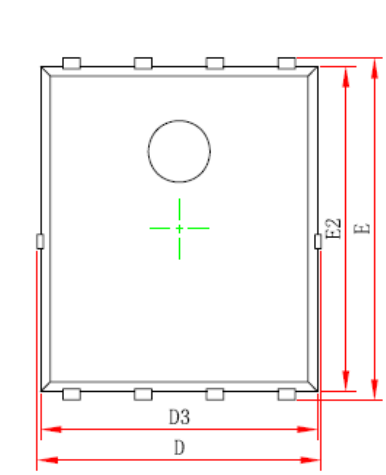
Recommended temperature profile for IR reflow



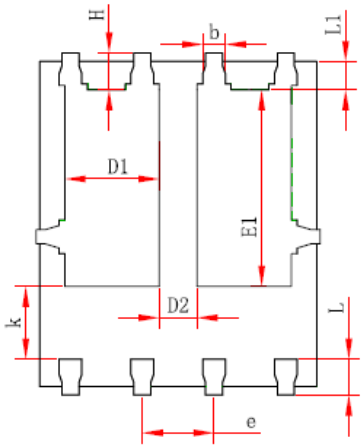
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note :1. All temperatures refer to topside of the package, measured on the package body surface.
2.For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

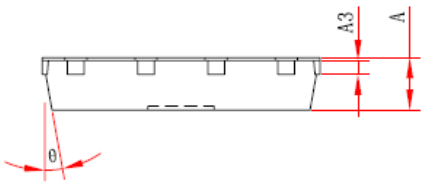
DFN5x6 Dimension



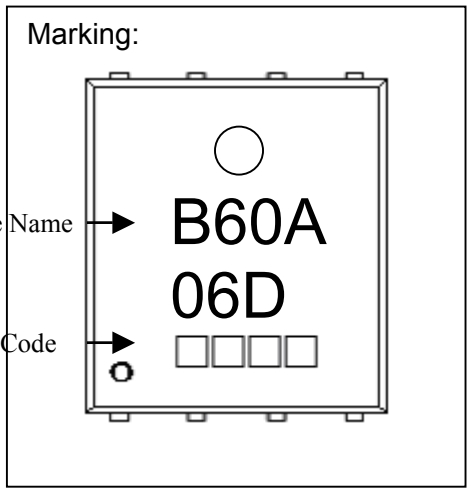
Top View



Bottom View



Side View



8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039	E2	5.674	5.826	0.223	0.229
A3	0.254 REF		0.010 REF		k	1.190	1.390	0.047	0.055
D	4.944	5.096	0.195	0.201	b	0.350	0.450	0.014	0.018
E	5.974	6.126	0.235	0.241	e	1.270 TYP		0.050 TYP	
D1	1.470	1.870	0.058	0.074	L	0.559	0.711	0.022	0.028
D2	0.470	0.870	0.019	0.034	L1	0.424	0.576	0.017	0.023
E1	3.375	3.575	0.133	0.141	H	0.574	0.726	0.023	0.029
D3	4.824	4.976	0.190	0.196	θ	10°	12°	10°	12°

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.